

AN INVESTIGATION OF THE ASTROMETRIC PROPERTIES OF THE KEPLER FOCAL PLANE

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Past experience with any device collecting photons from stars has shown that good photometry predicts good astrometry. While Kepler has demonstrated spectacularly good photometry, it has yet to yield even average quality astrometry over more than one 90 day time span, one "quarter", during which time Kepler remains at a set roll angle with respect to the sky. Concentrating on one test field for which we have already demonstrated high-precision (1 millisecond of arc) astrometry with a Hubble Space Telescope Fine Guidance Sensor (FGS), we propose to devise a methodology for extracting astrometry with a precision and accuracy commensurate with the world-class photometry. The techniques we devise can be then applied to any other set of targets. For this demonstration, our input catalog will contain every star on any CCD containing RR Lyrae. The proposal contains the results from a small pilot study of the RR Lyrae field to demonstrate our ability to access and model Kepler positional data. The preliminary results, even in the absence of the proposed calibrations, give us confidence that at least excellent proper motions could be obtained from Kepler. Once we have calibrated pairs of CCDs, we will press on to determine parallaxes.